Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A persistent p-type group II-VI semiconductor material comprising a thin film of a single crystal group II-VI semiconductor comprising atoms of group II elements and atoms of group VI elements, wherein the group II-VI semiconductor is doped with a p-type dopant selected from phosphorus, arsenic, antimony, bismuth, copper, and chalcogenides of the foregoing, and mixtures thereof, wherein the p-type dopant concentration is sufficient to render the group II-VI semiconductor material in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$.

2. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II elements are selected from zinc, cadmium, alkaline earth metals, and mixtures thereof.

3. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group VI elements are selected from oxygen, sulfur, selenium, tellurium, and mixtures thereof.

4. (deleted).

5. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.1 ohm·cm.

6. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.01 ohm·cm.

7. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the resistivity is less than about 0.001 ohm·cm.

8. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than 0.5 $cm^2/V \cdot s$.

9. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the carrier mobility is greater than 4 $cm^2/V \cdot s$.

10. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{16} to about 10^{22} atoms/cm^3.

11. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is greater than about 10^{16} atoms$\cdot cm^{-3}$.

12. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the p-type dopant concentration is in the range from about 10^{17} to 10^{19} atoms$\cdot cm^{-3}$.

13. (original) A persistent p-type group II-VI semiconductor material according to claim 1, wherein the group II-VI semiconductor material is deposited as a thin film on an amorphous self supporting substrate surface.

14. (original) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of arsenic, wherein the arsenic concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$.

15. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about 0.1 ohm·cm.

16. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about 0.01 ohm·cm.

17. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the resistivity is less than about 0.001 ohm·cm.

18. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than 0.5 $cm^2/V \cdot s$.

19. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the carrier mobility is greater than 4 $cm^2/V \cdot s$.

20. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{16} to about 10^{22} atoms·cm^{-3}.

21. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is greater than about 10^{16} atoms·cm^{-3}.

22. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the arsenic concentration is in the range from about 10^{17} to 10^{19} atoms·cm^{-3}.

23. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is deposited as a thin film on an amorphous self supporting substrate surface.

24. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises cadmium oxide.

25. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide further comprises magnesium oxide.

26. (original) A persistent p-type zinc oxide semiconductor material according to claim 14, wherein the zinc oxide is a non-stoichiometric zinc oxide compound.

27. (original) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of a antimony, wherein the antimony concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$.

28. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.1 ohm·cm.

29. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.01 ohm·cm.

30. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the resistivity is less than about 0.001 ohm·cm.

31. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the carrier mobility is greater than 0.5 $cm^2/V \cdot s$.

32. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the carrier mobility is greater than 4 $cm^2/V \cdot s$.

33. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is in the range from about 10^{16} to about 10^{22} $atoms \cdot cm^{-3}$.

34. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is greater than about 10^{16} $atoms \cdot cm^{-3}$.

35. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the antimony concentration is in the range from about 10^{17} to 10^{19} $atoms \cdot cm^{-3}$.

36. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide is deposited as a thin film on an amorphous self supporting substrate surface.

37. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide further comprises cadmium oxide.

38. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide further comprises magnesium oxide.

39. (original) A persistent p-type zinc oxide semiconductor material according to claim 27, wherein the zinc oxide is a non-stoichiometric zinc oxide compound.

40. (original) A persistent p-type zinc oxide semiconductor material comprising single crystal zinc oxide that is doped with a quantity of a p-type dopant selected from copper oxide, antimony oxide, bismuth oxide, wherein the dopant concentration is sufficient to render the zinc oxide a p-type semiconductor in a single crystal form, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 $cm^2/V \cdot s$.

41. (original) A persistent p-type zinc oxide semiconductor material according to claim 40, wherein the p-type dopant is copper oxide at a dopant concentration from about 3 to about 10 mole %.

42. (original) A persistent p-type zinc oxide semiconductor material according to claim 40, wherein the p-type dopant is antimony at a dopant concentration from about 1 to about 10 mole %.